ANTIHYPERTENSIVE MEDICATIONS ALTER LEFT VENTRICULAR FILLING PATTERN IN NORMAL SUBJECTS.

William R. Davidson, Jr., M.D., FACC, Carol W. Sexton, RDMS, and Joy C. Lehman, M.D.. Pennsylvania State University College of Medicine, Hershey, PA.

We sought to determine how two common antihypertensive drugs: hydrochlorothiazide (HCTZ, 25 mg po daily) and metoprolol (M, 50 mg po bid) influence the ventricular filling pattern. Using a randomized, blinded, crossover study design 13 healthy men (age 23-38 yrs) were given each drug for one week separated by a 1 week washout period. LV M-mode dimensions, HR, BP were recorded before (B) and after the week on each drug. LV filling (E and A peak velocities and area, E/A ratio) was measured by pulsed Doppler at the mitral annulus and the leaflet tips. Results: (analyzed by 1 or 2 way ANOVA): HR (68±9 vs 61±10) systolic BP (123 ± 10 vs 115±8) and diastolic BP (78±5 vs 72±7) were lower after M (all $p<0.01$) but not after HCTZ. LV diastolic dimensions did not change. M increased the E/A area ratio by 25% ($p<.05$). The annular time velocity integral (TVI) tended to be lower after HCTZ ($p<.10$). HCTZ decreased peak E by 7% ($p<.01$). M and HCTZ had opposing effects on peak E and A and on TVI (all $p<.05$). The E/A area ratio increased with decreasing diastolic BP (r .46, $p<0.02$). Many indices of LV filling were related to heart rate including A peak, E area, and both E/A and E/A area ratios (all $p<.05$).

Conclusion: Metoprolol can influence LV filling in normals by changing HR and/or BP. Hydrochlorothiazide can alter LV filling without changing HR or BP, possibly by subtle influences on stroke volume (TVI). Attempts to characterize LV filling in cardiac disease must control for these drug effects.

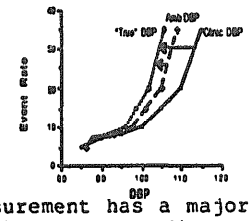
Tuesday, March 20, 1990
Poster Displayed: 2:00PM–5:00PM
Author Present: 3:00PM–4:00PM
Hall C, New Orleans Convention Center
Hypertension

ARE WE UNDERESTIMATING THE RISK OF HYPERTENSION BY THE USE OF TOO FEW BP ESTIMATIONS?

Andrew J.S. Coats, MD, James Conway, MD, Alberto Radaelli, MD, Susan J. Clark, PhD, Peter Sleight, MD. Oxford University, Oxford, UK.

Multiple readings improve the precision of the estimate of "usual" BP. The 1 month variability of clinic and 1,2,4,8, and >20 ambulatory DBP values measured in 100 untreated hypertensives are shown as standard deviations of difference (SDD) and inter-month correlations (table).

	SDD (mmHg)	Inter-Month r value
Clinic	12.6	0.59
1 amb.	13.8	0.51
2	10.4	0.66
4	8.8	0.73
8	8.3	0.75
>20	6.5	0.83



Less variable BP measurement has a major and predictable effect on the BP to cardiovascular event rate (BP:ER) relationship because of regression dilution. The steepness of the BP:ER slope is increased by up to 42% for ambulatory DBP instead of single BP readings in epidemiological studies. To test this we quantified regression to the mean over one month in our subjects for clinic and ambulatory DBP and replotted a typical BP:ER slope (figure).

The BP:ER slope with ambulatory DBP would be 40% steeper and give clearer indications for the need to treat. A population survey is overdue

DETECTION OF CORONARY DISEASE IN HYPERTENSIVE PATIENTS: ARE NON-INVASIVE TESTS ADEQUATE?

Susan P. Graham, M.D., Helen M. Sheehan, R.N., John McB Hodgson, M.D., F.A.C.C., Pramod K. Mohanty, M.D., F.A.C.C.. McGuire, VAMC, Med. Coll. of VA, Richmond and Case Western Reserve Univ. School of Med., Cleveland, OH

We prospectively studied 20 male patients (pts) with hypertension (HTN) with left ventricular hypertrophy (LVH) in order to assess the utility of exercise thallium (ET) test in predicting the presence of coronary artery disease (CAD) as detected by coronary angiography. Thus, we performed 2D echocardiography (2D-echo), ET and coronary angiography in random sequence and evaluated the result of each test independent of the knowledge of the results of other tests. Mean age of the group was 52±3 years, serum cholesterol 231±11 mg/dl and 65% of pts smoked cigarettes. Mean arterial pressure was 116±14 (±SD) mmHg. The 2D-echo derived LV mass index (LVMI) was 223±78 gm/m^2. Coronary arteries were normal in 3, diffusely narrowed in 9, discrete stenosis in 4 and diffuse irregularities in 4. Of 20 pts, 17 had abnormal exercise ECG response but only 2 (of 4 with discrete stenosis) had reperfusion defects by ET.

These results suggest that in hypertensive subjects with increased LVMI exercise tolerance test with or without thallium is unreliable in detecting the presence of CAD. Our study also indicates that diffuse coronary irregularities rather than discrete stenosis are common findings in pressure induced LVH in humans.

SIGNAL AVERAGING AND AMBULATORY ELECTROCARDIOGRAPHY IN PATIENTS WITH SEVERE LEFT VENTRICULAR HYPERTROPHY

Donald Heinz, MD, Vasilios Papademetriou, MD
Washington VA Medical Center, Washington, D.C.

Data from the Framingham Study shows that patients with left ventricular hypertrophy (LVH) have increased risk for sudden cardiac death. Recent studies have also shown that patients with LVH have a higher prevalence of complex ventricular arrhythmias than normal controls or hypertensive patients without LVH. Signal averaging is a noninvasive technique demonstrated to detect low amplitude, high frequency late potentials (LP's) which are present in patients with ventricular tachycardia (VT) and sudden death.

Signal averaging was performed to detect LP's in hypertensive patients (n=20) with severe LVH (mean LV posterior wall=16mm). LVH patients were compared to normotensive controls for the presence of LP's. Frequency of ventricular arrhythmias was measured on 48 hour Holter Monitoring in the LVH group. No subject in either LVH or control group had coronary artery disease or myocardial dysfunction as determined by history and physical, ECG and Echocardiogram. Signal averaging (40-250 Hz high-pass filter) was performed to measure filtered QRS duration (fQRS) and the root mean square of the voltage of the last 40 ms of the QRS complex (RMS40). Prolonged fQRS was defined as > 115 ms and abnormal RMS40 as < 20uV.

The fQRS duration (103± 8.8 ms) and RMS-40 (66± 46uV) in the LVH group was not significantly different from the control group (96± 9.2ms and 73±49 uV respectively). Forty-eight hour holter monitoring showed that six patients (30%) in the LVH group had VT (3 to 15 beat runs), seven (35%) had couplets and multiformed PVC's, and the remaining seven (35%) had frequent unifocal PVC's. The mean frequency of PVC's for all LVH patients was 23.1±52 PVC/Hr. Three LVH patients (15%) had LP's on signal averaging, compared to none in the control group. All three had prolonged fQRS duration (mean 120ms) and abnormal RMS-40 (mean 10.1uV). One of the three patients with a LP had a 5 beat run of VT, one had couplets, and the third had frequent, multiformed PVC's. Five other LVH patients had VT but no LP.

In summary, patients with LVH due to hypertension have more frequent and complex ventricular ectopy than would be expected in normal controls and ventricular late potentials tend to be more common. Late potentials in patients with LVH do not appear to predict more severe ventricular ectopy or nonsustained VT.